This document contains Appendix C from the 2004 Princess Cruise Lines Island Princess Data Report. Appendix C contains interview results for activities that impact wastewater generation. The report and all the appendices for this sampling event can be downloaded from ***http://www.epa.gov/owow/oceans/cruise_ships/island.html***

Island Princess

2004 Analytical Results

Appendix C

March 2006

Appendix C

INTERVIEW RESULTS FOR ACTIVITIES THAT IMPACT WASTEWATER GENERATION

GRAYWATER GENERATION DATA SHEET

Vessel: Island Princess
Date:
Recorded By: Donald F Anderson

Vessel Point(s) of Contact: Pero Batinic, Environmental Officer

Number of Passengers and Number of Crew Actually on Board:
Passengers: **2019**
Crew: **906**

Unusual Maintenance or Operational Activities Described By Vessel Point(s) of Contact:
None

Number and Time of Meals Served by Day (include passengers and crew) :
Food & Beverage Director: Osvaldo
Total: ~10,000 meals/day based on 3+ meals per person per day
Approx. Times:
Breakfast: 0600 - 1030
Lunch: 1100 - 1500
Dinner: 1630 - 2330
Other Meals: Room service, bars, etc.

Were **Dishwashers** Operated? (Circle one) **Yes** / No in all galleys, some 24/7
- All food preparation occurs immediately adjacent to all main galleys
- 10 main dishwashers operate essentially continuously - 24/7
- MSDSs provided for chemicals used in dishwashers - Approved Chemicals List from Princess Cruises corporate HQ
- Same operations and chemicals used in crew galleys
- SOMAT food pulping machines produce ~ 120 tons/day (wet); some solids incinerated
- Floor washing using "Encomp"
- Approx. water volume used in dishwashers:

What times were dishes washed by day?
Estimated volume of water per load:
Detergent name (obtain MSDS if available): See list of approved chemicals

Housekeeping Director: Angelo
Was **laundry** washed? (Circle one) **Yes** / No
If yes, number of hours per day laundry was operated:
Detergent and other chemicals names (obtain MSDS if available):
If yes, what weight, number of pieces, or number of loads were washed?
- 40 lbs per load;
- Passenger launderettes: two per passenger deck, except deck #7
- Crew launderettes: decks #2, #4, #12
- One large continuous tunnel washer for towels, linens; operates 0800 - 1500; 2000 - 0100
  - computer controlled with auto-scaling of entering materials then measured chemical dispensing in tunnel
  - counter-current flow from cleanest at outlet to dirtiest at inlet; floor around machine is

diked
    - menu of 10 - 15 mixes of chemicals depending upon material, degree of soiling
- Five large driers for tunnel washer; 50 lbs per machine
- Two large washing machines for blankets; 300 lbs ea, 10 loads per day
- Two small washing machines for passenger's personal items: 50 lbs per machine; number of loads per machine per day varies; typically operate 2000 - 0600

Estimated volume of water per load:
Are there floor drains in the laundry? Yes
Other Sources (e.g., small pantries, steward stations, cleaning stations):
Times these sources are generated:
Estimated volume per source:

- Dry cleaning area of laundry:
    - One Renzacci machine; five loads per day w/ auto-distillation of solvent (perc); "spent" perc was only 5 liters for ~ 7 ½ months (Jan - Aug '04)
    - Two Aquadex machines; approx 15 loads per day; water-based chemical - waste asserted to be non-hazardous
    - No sink, no drain, secondary containment
- MSDSs present for list of approved chemicals used

SPECIAL WASTES GENERATION AND DISPOSITION DATA SHEET

Vessel: Island Princess
Date: 8/30/04
Recorded by: Donald F Anderson

Photo Lab(s) On Board: yes or no (circle one) Deck #3
Waste handling and disposition:

- No wastewater treatment
- All three printers are digital
- Any residual chemicals are collected in three 50 gal drums which are off loaded in Vancouver, BC for disposal as HW
- Wastes are not analyzed for Silver content

Any waste treatment (e.g., silver recovery in photo lab)? No

Inspect area for floor drains. Are drains blocked or open? Where do the floor drains lead? Describe any streams that enter the floor drains.

- Two floor drains are capped
- Any floor spillage is captured to in-room storage vessel for shore disposal

Inspect area for sinks. Is sink(s) drain blocked or open? What is the disposition of sink(s) water? What wastewater streams enter or potentially enter the sink(s) (e.g., hand washing, rinse/clean equipment, prepare chemical solutions, etc.)

- Yes a sink is present but drain is isolated and drainage captured for shore disposal

Inspect area for chemical storage. Are chemicals stored over a sump or other secondary containment?

- Chemical tanks (starter, developer, stabilizer, replenisher, etc.; from list of approved chemicals) within secondary containment
- MSDSs present for list of approved chemicals used

Print Shop(s) On Board: yes or no (circle one) Deck #3
Waste handling and disposition:
Any waste treatment (e.g., silver recovery in photo lab)?

- No
- Any residuals (e.g., cleaning rags with solvents / chemical residues) are off loaded for disposal as hazardous waste on shore

Inspect area for floor drains. Are drains blocked or open? Where do the floor drains lead? Describe any streams that enter the floor drains.

- One floor drain is capped
- Any floor spillage is captured to in-room storage vessel for shore disposal

Inspect area for sinks. Is sink(s) drain blocked or open? What is the disposition of sink(s) water? What wastewater streams enter or potentially enter the sink(s) (e.g., hand washing, rinse/clean equipment, prepare chemical solutions, etc.)

- Yes a sink is present but drain is isolated and drainage captured for shore disposal

Inspect area for chemical storage. Are chemicals stored over a sump or other secondary containment?

- Chemicals in closed locker, with no drain
- MSDSs present for list of approved chemicals used

Chemical Storage Area On Board: yes or no (circle one)
Waste handling and disposition:

- Any spills from engine room storage areas go to bilge; bilge compartments generally segregated and pumpable to appropriate storage and disposal (HW, Non HW, etc)
- Each storage area has MSDSs present for list of approved chemicals used; eye wash(s) nearby
- Almost all chemicals asserted to be on Approved Chemicals List (ACL - Princess Cruises; e.g., housekeeping, etc.)

Any waste treatment (e.g., silver recovery in photo lab)?

- Any oily wastes from bilges go to oil / water separator

Inspect area for floor drains. Are drains blocked or open? Where do the floor drains lead? Describe any streams that enter the floor drains.

Inspect area for chemical storage. Are chemicals stored over a sump or other secondary containment?

- Engine room stores - degreasers, defoamers, paints, other "industrial use" and water treatment chemicals (hypochlorite), etc
  - Engine Rm. storage area #1*: (* - author defined): water treatment compartment - hypochlorite, coagulants, etc. - some secondary containment
  - Engine Rm. storage area #2: HCl, $Na_2S_2$03, hypochlorite, compressor lubes, etc. - spillage to bilge which can be pumped to storage for appropriate disposal
  - Engine Rm. storage area #3: Muriatic acid, Metal Brite (phosphoric acid), engine room lube oils, etc. - some secondary containment
  - Engine Rm. storage area #4: Alkaline chemicals, segregated from acid chemicals (e.g., Engine Rm. storage area #3) - some secondary containment
  - Engine Rm. storage area #5: Dry sludge, oily rags - off loaded in Vancouver, BC for disposal
- Store rooms on Deck 3 and other decks / locations as noted
  - Deck 3, #1 - chemical storage: acids, alkalies, oxidizers separated with labels on floors; no extra space for separate storage of acids, alkalies, oxidizers, flammables; dikes, no drains
  - Deck 3, #2 - Paper and print shop chemicals; no drains
  - Rm #6103 - deck cleaner; sink drains to GW, some secondary containment, no drain
  - Rm #6101, #6105 - paint, polyurethane, acetone, WD 40, etc., kept in lockers, no drains
  - Rm #10101: sink with drain (hand washing only) to GW; perchloroethylene dry cleaning fluid storage; no drain, thus warning posted for no chemical pump
  - Rm #8101 (forward / bow / SB): locker for housekeeping chemicals, no drain
  - Rm #8107 (forward / bow / SB): locker for housekeeping chemicals, acids (e.g., sulfamic acid), matches in locked safety cabinet, no drain

Medical Infirmary On Board: yes or no (circle one) Deck #3
Waste handling and disposition:
Any waste treatment (e.g., silver recovery in photo lab)? No

Inspect area for floor drains. Are drains blocked or open? Where do the floor drains lead? Describe any streams that enter the floor drains.

- Floor drains to GW
- No floor drain in digital imaging room

Inspect area for sinks. Is sink(s) drain blocked or open? What is the disposition of sink(s) water?

- Sinks drain to GW.

What wastewater streams enter or potentially enter the sink(s) (e.g., hand washing, rinse/clean equipment, prepare chemical solutions, etc.)

- Hand washing only; no chemical dumping through sinks.

Inspect area for chemical storage. Are chemicals stored over a sump or other secondary containment?

- Digital imaging is used exclusively, no X-Ray developing chemicals present
- Any clean up wastes collected by EO for on-shore disposal

Garbage Room On Board: yes or no (circle one)
Waste handling and disposition:
Any waste treatment (e.g., silver recovery in photo lab)?

- Room is refrigerated, no treatment, only solid / wet waste separation / crushing equipment (e.g., glass, aluminum and tin cans, box board, wet garbage; flourescent tubes, batteries for separate disposal, etc)

Inspect area for floor drains. Are drains blocked or open? Where do the floor drains lead? Describe any streams that enter the floor drains.

- Two drains to bilge and oil / water separator (OWS)

Inspect area for sinks. Is sink(s) drain blocked or open? What is the disposition of sink(s) water? What wastewater streams enter or potentially enter the sink(s) (e.g., hand washing, rinse/clean equipment, prepare chemical solutions, etc.)

- Hand washing only

Inspect area for chemical storage. Are chemicals stored over a sump or other secondary containment?

- Hazardous chemical locker with no drains

PESTICIDE, FUNGICIDE, AND RODENTICIDE USE DATA SHEET

Vessel: Island Princess
Date: 8/30/04
Recorded by: Donald F Anderson

Pesticides Used On Board: yes or no (circle one)

- **No liquid pesticides are used**
- bate for cockroaches is solid, certified for use; see Princess Cruises / IP manual (06/2002)

Pesticide Name	Target Pest(s)	Amount Used/yr	MSDS Obtained (yes/no)
See ACL_____	_____	_____	_____

List Locations Where Pesticides are Normally Applied and Stored On Board and Dates Applied:

- Various, as needed

Potential to Enter Graywater/Blackwater Systems (e.g., application, spills, floor drains)?

- Minimal; only if picked up by cleaning water is used

Person(s) Responsible for Pesticide Application: EO, housekeeping

Fungicides Used On Board: yes or **no** (circle one) None

Fungicide Name	Target Fungi	Amount Used/yr	MSDS Obtained (yes/no)

List Locations Where Fungicides are Normally Applied and Stored On Board and Dates Applied: NA
Potential to Enter Graywater/Blackwater Systems (e.g., application, spills, floor drains)? NA
Person(s) Responsible for Fungicide Application: NA

Rodenticides Used On Board: yes or **no** (circle one) None

Rodenticide Name	Target Rodent	Amount Used/yr	MSDS Obtained (yes/no)

List Locations Where Rodenticides are Normally Applied and Stored On Board and Dates Applied: NA
Potential to Enter Graywater/Blackwater Systems (e.g., application, spills, floor drains)? NA
Person(s) Responsible for Rodenticide Application: NA

COLLECTION, HOLDING, AND TRANSFER (CHT) TANK DATA SHEET

Vessel: Island Princess
Date: 9/1/04
Recorded by: Donald F Anderson

See information submitted with Vessel Specific Sampling Plan (VSSP) for Island Princess submitted to ADEC, Enclosure #2, V.3, dtd 4/29/04

Tank Number or Identification:
Wastewater Source(s):
Tank Volume:_____ m^3 or gallons
Does the Tank Have Vacuum: yes or no (circle one):
Vacuum: ____ mm Hg
Tank Material of Construction:
Is this a double bottom tank: yes or no (circle one)?
Normal Operating Volume: _____ m^3

Automated Tank Gauging and Discharge System: **yes** or no (circle one) Digital via control room

Discharge Type: batch or continuous (circle one)
Totalizer or Flow Meter on Discharge Line: yes or no (circle one)
Discharge Flow Rate: _____ m^3/min or m^3/day
Wastewater Destination After Leaving the Tank:
Approximate Diameter of Discharge Line: _____ inches
Screens or Filters Present on Either Influent or Discharge Lines (describe):

Chemical Additions to Tank:

Chemical Name	Purpose	Amount	MSDS (yes/no)
_____	_____	_____ kg/day	_____
_____	_____	_____ kg/day	_____
_____	_____	_____ kg/day	_____

Is sludge removed from this tank (describe frequency, amount, destination)?:

WASTEWATER TREATMENT UNIT DATA SHEET

Vessel: Island Princess
Date: 9/2/04
Recorded by: Donald F Anderson

Description of Treatment Unit: MBR

Manufacturer: Hamworthy

Model: Not specified; some modifications made on board by crew

Design Drawings Obtained: yes or **no** (circle one)

- all online / on board but too numerous and most far too detailed for purposes; would require immense effort to obtain on board; basic diagrams (e.g., screen shots) and system costs requested from Leslie Geiger, Princess Cruises in 9/3 email as followup
- Other information supplied while on board by Rosario Segreto, CE; see below

Design Capacity: _____ gpd or gpm (circle one)

Typical Operating Flow Rate: ~ 450-600 cubic meters per day_ gpd or gpm (circle one)

Operational period: _____ hours 24 / 7 / 365

Chemical Additions: None added

Chemical	Amount	Units	MSDS Obtained

Electrical Requirements:

Volts: _____ Amps: _____ Horsepower: _____

Sludge Generation: **yes** or no (circle one)
If yes, describe frequency, amount, and destination: Approx. 10 metric tons per week

Was maintenance performed on treatment unit: **yes** or no (circle one)

- System taken down for maintenance 8/30, 1200 - 1600, per Rosario Segreto, CE; MBR maintenance, and also including use of $HClO_3$ to clean over board discharge pipe; other activities, if any, not noted

If maintenance was performed, estimate labor: __4____ hours

List operating parameters recorded (e.g., flow, temperature, pressure, pH), typical values, and range for this unit. Record or obtain copy or printout of logs for the duration of the sampling episode.

SOURCE WATER DATA SHEET

Vessel: Island Princess
Date: 9/2/04
Recorded by: Donald F Anderson

Is Potable Water Generated On Board the Vessel: **yes** or no (circle one)

- Evaporators - six effects, 700 metric tons per day each set, three sets; 2100 tons per day total capacity
- Remainder of reserve capacity from bunkering municipal water up to ~ 850 tons per day, from Vancouver, Skagway, Juneau, Ketchikan

Describe the On-Board Potable Water Treatment and Disinfection Method:

- Chlorination to PHS stds using hypochlorite with acidification

Port (City) Where Source Water is Obtained if Not Generated On Board:

- Vancouver, Skagway, Juneau, Ketchikan

Treatment Method for Source Water Obtained in Port:

- See publicly available sources for cities / water supplies noted above

Disinfection Method for Source Water Obtained in Port:

- PHS-based method: Checked for fecal coliform; Hypochlorite add to 5 ppm, retested after 24 hrs, if residual hypo equal to or greater than 3 ppm, OK, if not water is dumped

Fluoride Added to Water Obtained in Port: yes or **no** (circle one)

Additional Disinfection Performed On Water Obtained in Port: yes or **no** (circle one)

- See above for primary method

Describe Additional On-Board Disinfection Method: None

Description of Source Water Sample Collection Point On Board Cruse Ship: Various - at supply tanks and ends of piping runs on upper decks